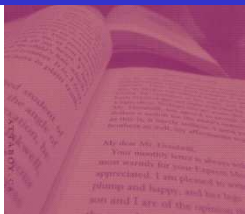




# ICT drives Innovations and growth in India: Can it help overcome its dilemmas?

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# India was struggling in eighties

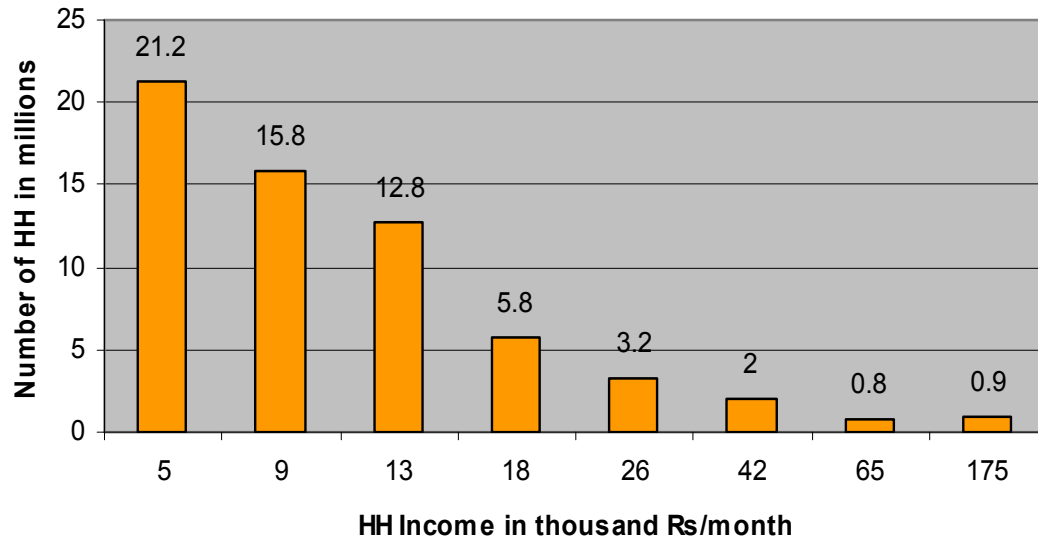
- ❑ One had to wait for eight years to get a telephone
- ❑ Deposit money to get in a queue
  - ▶ To buy a two-wheeler took four years
  - ▶ Gas connection took even longer
- ❑ A one way Delhi to Chennai air-ticket cost equal to six months of a faculty salary (salary) at IIT
- ❑ Importing a simple \$3 microprocessor IC took one year
  - ▶ So did an import of a Personal Computer

Life was difficult

# Somewhere India Learned

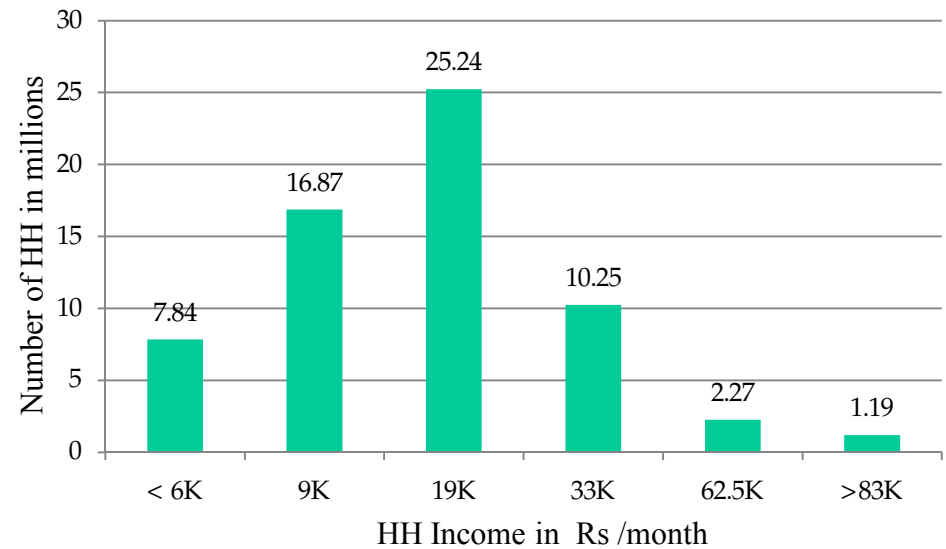
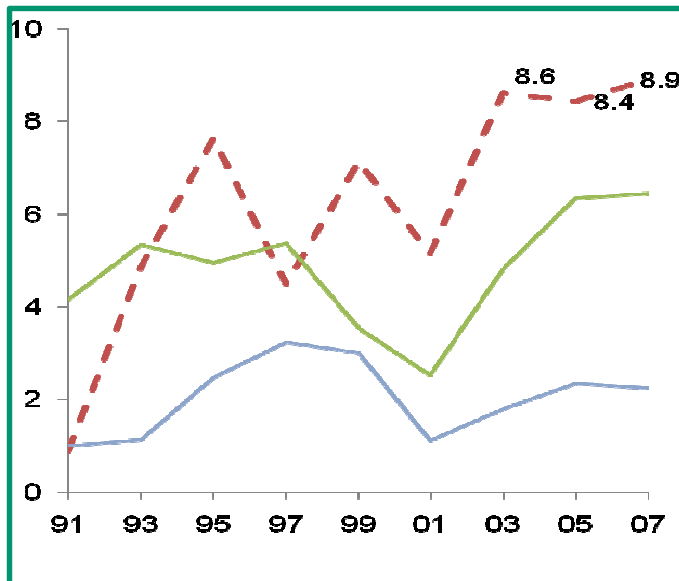
- ❑ India is a very large market
  - ▶ But at the right price point
- ❑ Entrepreneurship is the best and fastest driver of development
- ❑ S&T Innovation can be used to make changes in India
  - ▶ Technology level: to make products affordable to Indians
  - ▶ Operations level: organizations / business which can scale
  - ▶ Policy level: to help business work
    - S&T personnel in a unique position to influence policies

# Urban Indian has changed: 65M urban homes



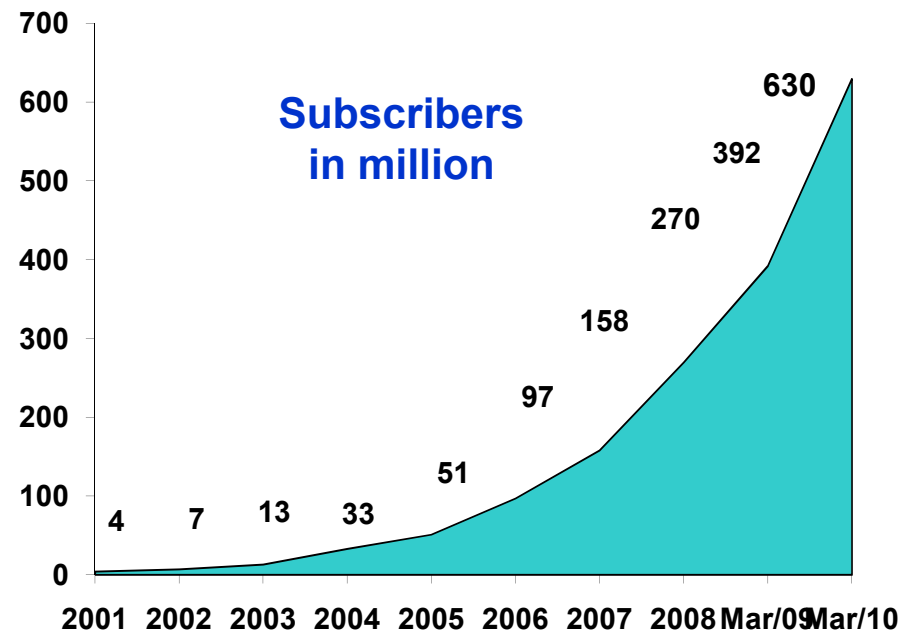
2001

2007



# Mobiles in India boomed at right price point

- Not until Mobile Infra CAPEX < Rs3K/ line
  - ▶ service available at < 50 p/minute
  - ▶ ARPU of about Rs 100/ month
  - ▶ **15+ million subscribers added each month**



Just Like number of TVs in India rose from 10 million to 100 million in 90's when TV prices became Rs1200 onwards and cable TV tariff fell below Rs75 per month

- Entertainment industry in India one of the biggest

# India on Move

- ❑ Airline Industry is booming in India: six times passenger capacity in five years
  - Average tariffs have fallen to a fourth: affordable to middle class Indians
    - In spite of rising petrol prices
    - **The only limitation** to growth is the **airport infrastructure**
- ❑ Auto Sector is booming
  - R&D driven initiative: Scorpio and Tata-Indica and now Tata Nano
  - India emerging as leader in auto-component design and manufacturing
- ❑ India's cement plants in 90's virtually closed as they could not compete
  - Today India has some most energy efficient plants of the world
- ❑ Electricity from wind energy surpasses its nuclear energy
  - India's wind energy company is the fastest growing one in the world
- ❑ Indian companies carrying out successful Drug discovery
  - Spends USD50-70M as opposed to USD800M for a drug

# Engineering Education

- 1.4 M engineering students graduate every year from 2800 engineering colleges
  - Up from 25,000 in 100 schools in early eighties
  - Uneven quality is a major problem
    - was foreseen and resulted in reluctance to expand

But it is this human resources which has driven growth

- Growth of IT and IT enabled services is legendary
  - ▶ Reaching USD50 billion a few years back
  - ▶ **Trillion dollar** IT Services industry being projected

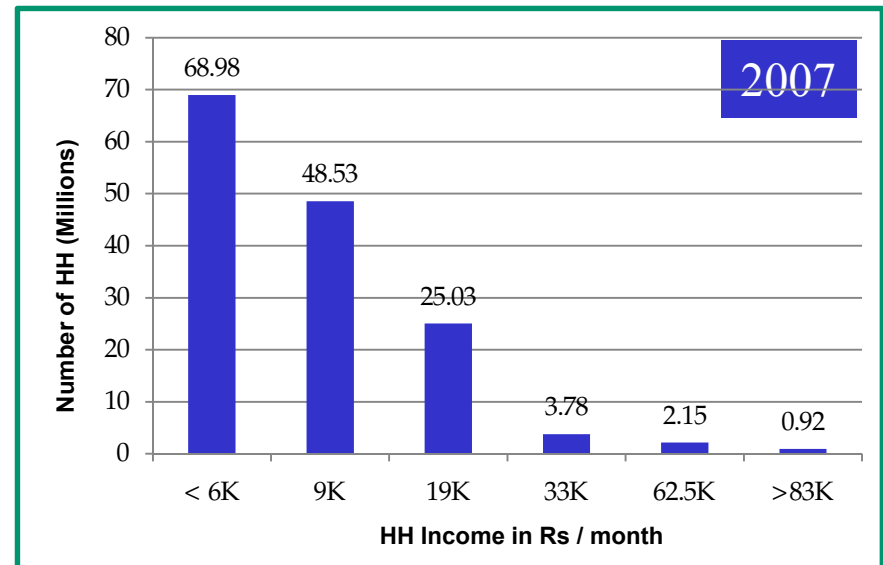
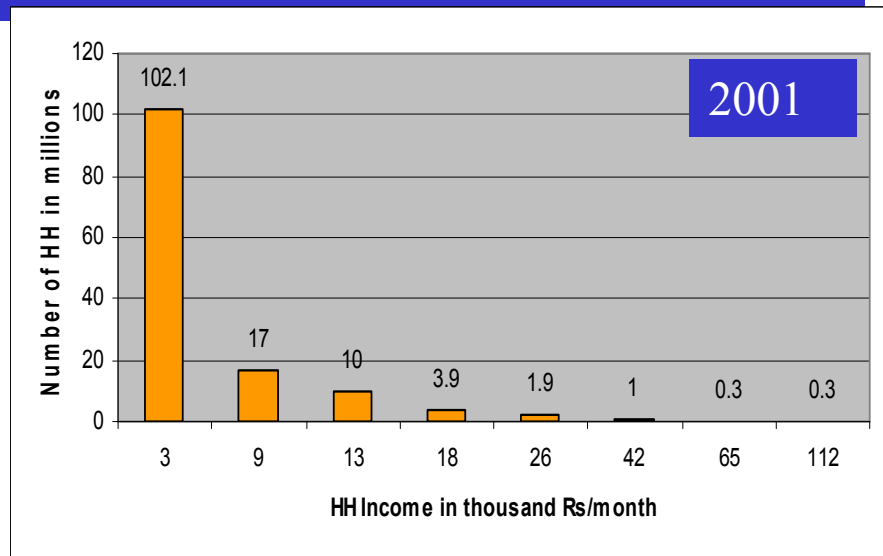
## The World is Flat

*But you aint seen nothin yet*

for the changes has not yet touched Rural India

# Dilemma I: Rural India is still far behind (700M people, 140M homes)

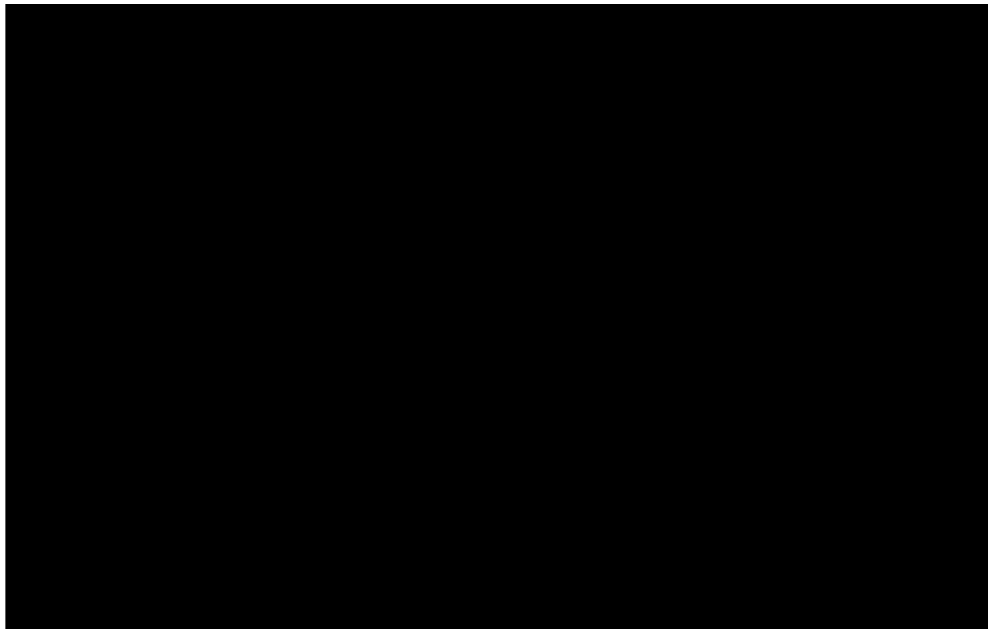
- ❑ Media has grown, reaches villages and is independent
  - ▶ It **shows the disparity** between urban and rural life everyday
- ❑ Indian democracy is strong
  - ▶ Gives opportunity almost every two years for people to vote out
    - ▶ governments and policies which leaves them behind
  - ▶ **Singrurs** are a reflection of this
- ❑ Politically unsustainable
  - ▶ Government reacts: make **social programs** its primary emphasis
    - ▶ Ahead of infrastructure for growth



# India Responds Creatively

- ❑ Government Focus on Large Social Programs
  - ▶ NREGS: 100 days of guaranteed employment per year to one member of every household
  - ▶ NRLM : to reduce poverty among rural BPL through gainful self-employment and wage employment
  - ▶ Bharat Nirman - rural infrastructure-- irrigation, road, housing, water supply, electrification & telecom
  - ▶ National Rural Health mission
  
- ❑ Innovative Private Response: entrepreneurship using ICT
  - ▶ World-over rapid development in 20th centuries took place due to outsourcing of manufacturing and services
  - ▶ started with routine services, but the nations used this to build skills and acquire business and technical leadership
  - ▶ Can we now outsource manufacturing and services to villages and generate wealth and confidence?

- ❑ Manufacturing contracts not involving heavy machinery and large power
  - ▶ Advantageous if some raw materials are from villages
  
- ❑ Creation of Rural Delivery Model (RDM)
  - ▶ Enable technology to move work to where people are, rather than move people
  - ▶ Can we have a 25 seater BPO in each village employing 50 people?



# Agriculture: Managing Risks for farmers



**Before**  
Okra crop  
turning white

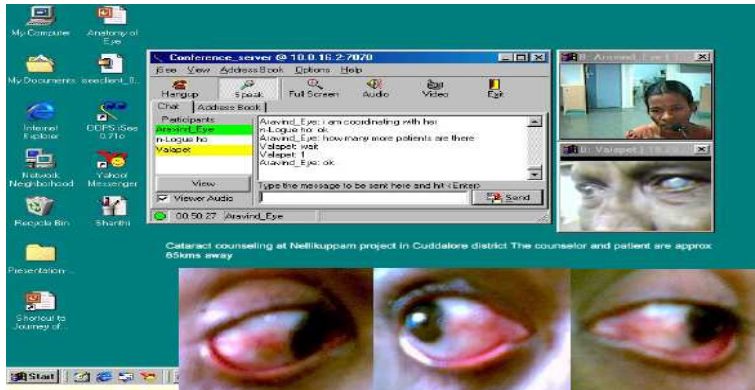
Pictures sent  
to the experts  
at **Madurai  
Agricultural  
College**:  
diagnosed it as  
"Yellow Mosaic  
disease"



**After**

- ❑ **Crop disease**: video conferencing to connect an agricultural Expert
  - ▶ Obtaining answers before it is too late
  
- ❑ **Rain-fall insurance**
  - ▶ Micro-weather Measurement and prediction
    - Collect Temperature, humidity, pressure, wind speed, wind direction and rainfall at each village
    - ▶▶ Weather Monitoring Kit : Rs20K
  
- ❑ **Market risk**: use of commodity exchanges forward pricing and Options
  - ▶ Can one get small farmers to use it?





Remote Eye Care



Vet care with Veterinary college

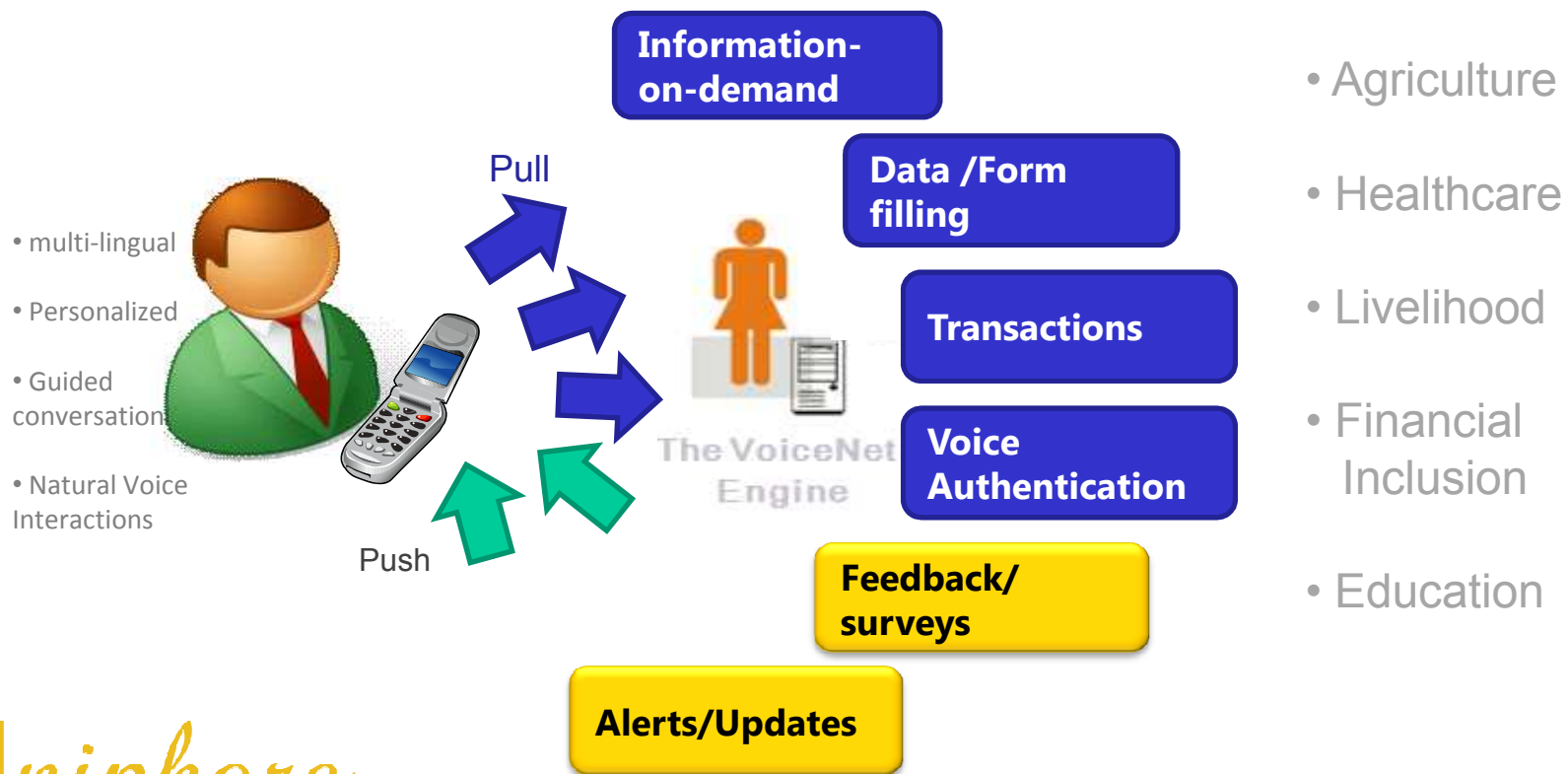
## Strengthening Health Care: Telemedicine

- ❑ Initial experiments with eye-care and with Veterinarian using the video conferencing
- ❑ Moved on to video-consulting for GP & gynecology problems
- ❑ Designed Telemedicine kit costing Rs25K
- ❑ Focus on Village Health Practitioners: Training, Medicine Basket, Test systems, Referral



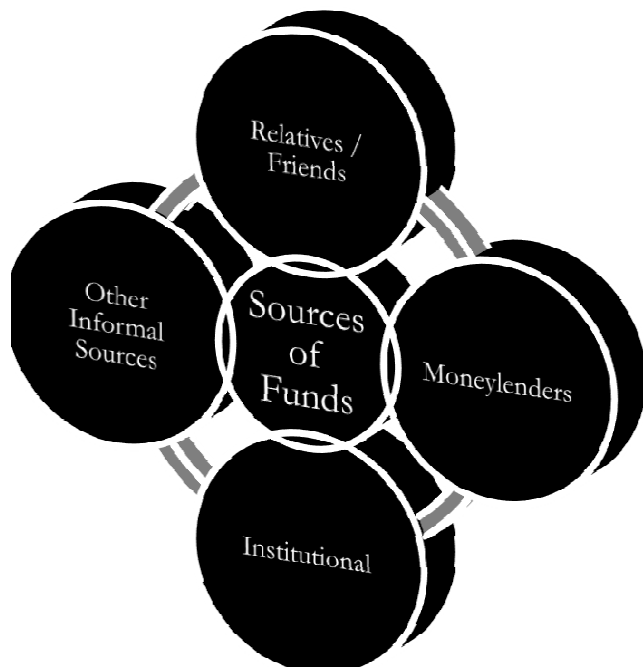
# Making Affordable Finance Available in Rural India

- Mobile Banking can reach most rural customers
  - as most villagers are illiterate or semi-literate
    - **Voice based Mobile Banking** in local language / dialects



# Finance facility in Rural India: cash-in / cash-out?

- ❑ Using Rural ATMs
  - At a price point close to a fifth of regular ATMs
  - Powered on solar
  - Remote Electronic Lock
- ❑ Using Internet Kiosks
  - Business Correspondents
- ❑ Using Mobile Banking and BCs
  - especially voice based



Gramateller



- ❑ Unique ID will enable Credit rating of rural customers
  - Simple overdraft credit can meet
    - most emergency consumer needs in rural India

# Dilemma II: Can we all “Grow”

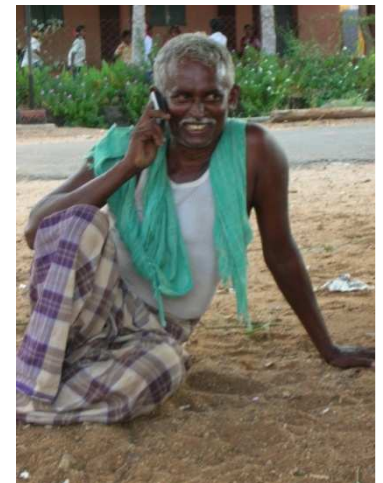
- ❑ India consumes
  - Less than a fifteenth of per capita resource as compared to that in the West
    - as per IEASD, India consumed 512.4 Kg of oil equivalent of energy per person as opposed to 7794 Kg of oil equivalent per person in USA in 2003
- ❑ If India and China grow like West?
  - ❑ And their per capita resource consumption of 1.4 billion Chinese and 1.1 billion Indians reach even half the level in the West

## Nature is already retaliating

- This can not be our future
- Technology can help but cant support consumption beyond a point
- ❑ And yet, India and China can not be asked to wait to get out of their deprived state
- ❑ AND they can not grow and acquire the same lifestyle as that of the West

# Revitalize Rural Areas

- ❑ While India consumes 1/15 per capita as compared to West
  - Rural India consumes one fifteenth per capita as compared to Urban
- ❑ Need to fix rural India so that people choose to stay there
  - With health, education, a bit of infrastructure and livelihood opportunity, life in Rural India may be better than in urban areas
- ❑ Need to redefine development
  - Not accept the Industrial Revolution Development paradigm
    - More one consumes, better it is for economy
    - Technology can find all the answers
    - Urban life is better life
- ❑ Good life need not imply such large consumption



# Dilemma III: Governance

- ❑ Over the last two decades India has strengthened
  - ▶ Its election system: free of muscle power
  - ▶ Its press: fairly diverse and independent, even though often poor
    - Chasing TRP
  - ▶ Its judiciary: though poor but very independent: require reforms
  - ▶ Its regulators, CAG, CVC: normally very independent
  - ▶ Its intelligence: ?
  - ▶ Its police: require urgent reforms
  - ▶ Its bureaucracy: ?
  
- ❑ Corruption and collusion between business, politics, bureaucracy, media and unions

# Can Innovation be used to overcome

- ❑ the current crisis of Governance?
  
- ❑ Can Technologies be used to overcome corruption?
  - ▶ In 80's middle-class India was tired of corruption in train reservations
  - ▶ Computerized train reservation largely overcame this
  
- ❑ Cash transactions are key drivers of black money
  - ▶ Can electronic transactions replace cash transactions
    - » But not everyone has computers and Internet
  - ▶ They have mobiles
  - ▶ Can Mobile Payment enable micro-payments?

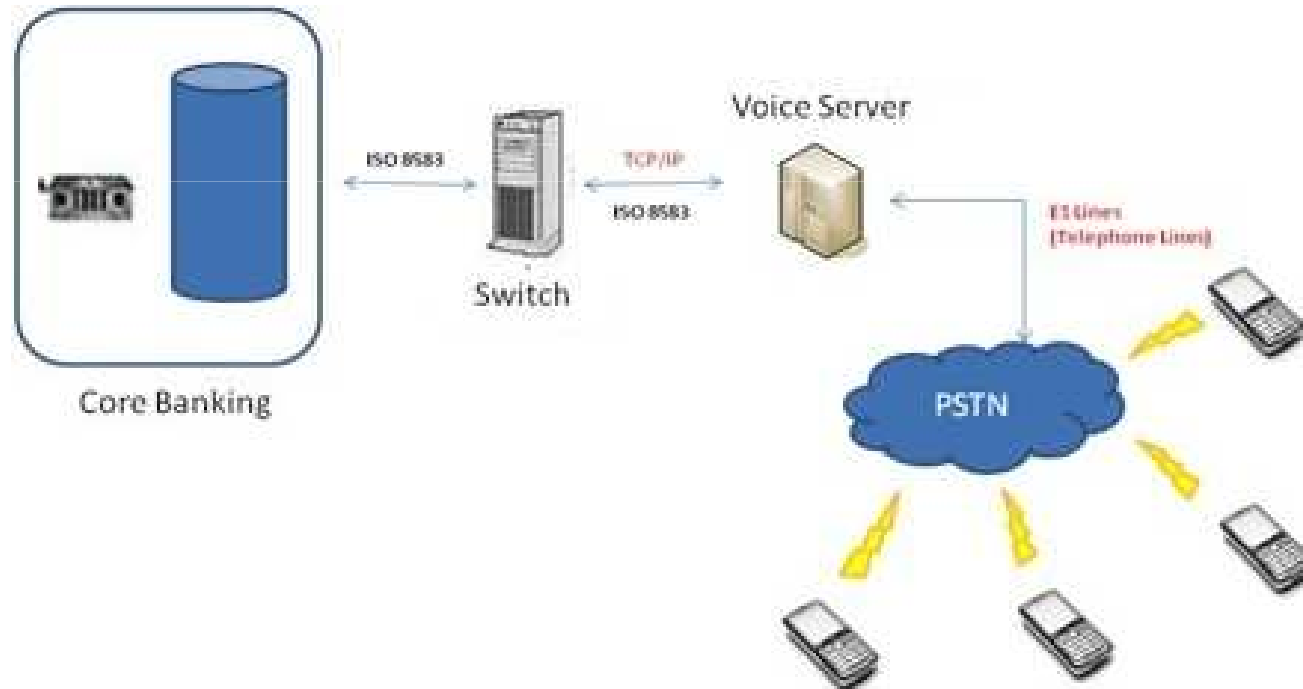
# Can Mobile payments displace cash?

- ❑ Huge reduction of transaction costs
- ❑ Huge reduction of cash carrying costs
- ❑ Introduces traceability in this governance deficit environment
  
- ❑ Huge boon to GDP and Governance in the nation...
  - ▶ Rs 500 and 1000 notes can be recalled
  - ▶ All establishments could be obligated to use electronic transactions above Rs 1000

Anytime  
anywhere  
banking

# Voice Based Mobile Banking

an interactive Voice Mobile Banking application performing balance checks, account transactions, payments



## Features:

1. Real time transaction with banking systems over ISO 8583
2. Voice Biometrics based authentication
3. Speech recognition based IVR applications in multiple languages
4. Real time print receipts
5. Transaction confirmation over SMS

# To Sum Up

- ❑ ICT has helped India use innovations to drive growth
- ❑ Can it help it overcome its dilemmas?
  - ▶ Growth can not be primarily confined to urban India
    - Leaving Rural India behind
  - ▶ India's growth path can not be same as that of the West
    - Higher and higher consumption is not sustainable in the world
  - ▶ Young and Confident India need better Governance
    - Electronic payments are traceable and reduce black money